

and unity from whence its charm arises, without rendering it appropriate for the service of the altar. Hence it never became a favourite in the west. Though the circular is unsuited in itself for a Christian church, yet if employed as a part of the plan, and connected with other members, it is susceptible of the highest excellence. Great difficulties, however, attend its application: the Byzantine architects may claim the merit of first attempting to work the problem, never entirely solved until Wren's transcendent talent raised our metropolitan cathedral:—

'An entirely new form for churches was, at an early period, introduced at Constantinople. The oblong was shortened into a square, with a view to the noble addition of the dome, which the Byzantine architects had now learnt how to support. This plan, especially after the creation of St. Sophia, became a favourite in the east, and was adhered to, in those parts, with the greater tenacity, in consequence of the schism which subsequently took place between the Pope of Rome and the Patriarch of Constantinople. There was to be a difference in every thing. The Greeks insisted upon the square form of their own inventions, whilst all the nations who continued to acknowledge the supremacy of the pope, continued to employ the long forum, which was persevered in at Rome.

'The Greek plan was, in course of time, introduced into Italy by the Greeks themselves, in such parts of that country as remained in the hands of the Greek Emperor, and in the north by the Venetians:—*Int.*, p. lii.

Mr. Knight's observations with regard to the antagonism of the eastern and the western churches, are entirely correct. Except when favoured by peculiar political relations, it is remarkable how little influence was exerted in Italy by Byzantine art. Ravenna and Venice are almost the only localities where we may trace any decided imitation of the type of Constantinople. Indeed, there was little to be gained. Deduct mere barbaric splendour—barbarie, perhaps, in the truest meaning of the word—and there is a spirit, genius, energy, in the rudest churches of Latin Christendom, wanting in the most sumptuous edifices of the Greeks. The very buildings reflect the characters of their respective communities. Nor is it less important to remark, how entirely unimportant are the noblest works of art in eliciting a corresponding talent amongst those who are accustomed to behold them. To judge of the lessons which the productions of Phidias and Praxiteles imparted to the Byzantine artists, look at the 'tre ladri,' the group inserted in the angle of the church of St. Mark! Had it not been for later interpolations, San Vitale, at Ravenna (plate ix.), would have been the most perfect Italian specimen of the Byzantine type.

This church was erected in 547, by Julianus, the treasurer, at the command and with the assistance of the Emperor Justinian.

The plan at once reveals its Eastern origin, and its affinity to that of St. Sophia, which had been erected at Constantinople a few years before. Instead of a Latin basilica, it is an octagon supporting a dome; not, however, unprovided with the addition of the indispensable aisles. This plan must have come direct from Byzantium, and was the first appearance of the Byzantine style in Italy.

The chief architectural novelty and leading feature in this building is the dome. No vaulting of any kind had ever been hitherto employed in the roofs of churches, much less that most skilful and admired of all vaulting, the cupola, or dome; a mode of covering buildings perfectly well understood by the Romans, but discontinued as art declined, and, for the first time, reproduced by the Greek architects of Constantinople, in the instance of St. Sophia. If it is difficult to support the downward pressure and outward thrust of ordinary vaulting, how much more is required when the pressure has to be resisted at every point, and the circle above has, as is frequently the case, to be connected with the square below! This was accomplished, in the construction of St. Sophia, by means of what are technically called *pendentives*; brackets, on a large scale, projecting from the walls at the angles, and carried up to the base of the dome. At San Vitale, which is not a square, but an octagon, a series of small arches is employed, instead of pendentives, but acting upon the same principle. By this expe-

dient the dome is united to the body of the edifice. The thrust has then to be resisted by the thickness of the walls; and the downward pressure to be supported by arches and piers. In most cases the pendentives are exposed to view; but at San Vitale the mechanical contrivances are concealed by a ceiling. It was always an object to diminish the weight of the dome; and, with this view, materials of the lightest kind were employed in its construction. Sometimes a sort of pumice-stone was used. At San Vitale the dome is composed of a spiral line of earthen vessels, inserted into each other; and where the lateral thrust ceases, and the vertical pressure begins, larger jars are introduced in an upright position.'

A long interval elapses before Byzantine architecture reappears in Italy; for once only, but with expiring splendour:—

'The plan of St. Mark's, like that of Santa Sophia is a Greek cross, with the addition of spacious porticoes. The centre of the building is covered with a dome, and over the centre of each of the arms of the cross, rises a smaller cupola. All the remaining parts of the building are covered with vaults, in constructing which the Greeks had become expert, and which are much to be preferred to the wooden roofs of the old basilicas.

Colonnades and round arches separate the nave from the aisles in each of the four compartments, and support galleries above. The capitals of the pillars imitate the Corinthian, and are free from the imagery which at that time abounded in other churches of Italy. It is computed that in the decoration of this building, without and within, above 500 pillars are employed. The pillars are all of marble, and were chiefly brought from Greece and other parts of the Levant. Whilst St. Mark's was building, every vessel that cleared out of Venice for the east was obliged to bring back pillars and marbles, for the work in which the republic took so general an interest.

The defect of the interior of St. Mark's is, that it is not sufficiently light. The windows are few in proportion to the size of the building. Rich, therefore, as the interior is, it is gloomy to a fault, in spite of the brilliant rays of a southern sun.'

The reviewer then proceeds to investigate more closely the causes which rendered the plans of the heathen temple, and the sepulchral church, inconvenient or inappropriate for the general purposes of liturgical worship, and lead to the adoption of another type, more adapted to the Roman ritual.

#### FALL OF YARMOUTH SUSPENSION BRIDGE.

It is our painful duty this week to record the destruction of the suspension bridge at Yarmouth, accompanied by a scene of horror which baffles all description. This distressing and almost unprecedented calamity, involving the death of upwards of 100 persons, took place on Friday afternoon, the 2nd inst., and was occasioned by the breaking of one of the principal chains of the bridge, caused by the weight of an extraordinary number of persons being thrown on one side of the structure for the purpose of witnessing the absurd exhibition of a theatrical clown drawn by four geese in a washing-tub.

An inquest is now sitting on the bodies of the unfortunate sufferers, and doubtless competent persons will be examined touching the quality of the material of which the bridge was formed, as well as the mode adopted in its construction. The bridge was erected by the late Mr. Robert Cory in lieu of the ancient ferry across the Bure, of which he was possessed, and was opened on the 23rd of April, 1829. The chain on either side is attached to four pedestals or piers, also of iron, and fastened to abutment stones.

In April, 1844, in contemplation of increased traffic to the railway, in order to afford sufficient width for carriages to pass, a platform for foot passengers was erected outside the bars on either side, it being the intention of the proprietors, on completing an arrangement with the railway company, and obtaining an Act of Parliament, which has been applied for this session, to erect a new arched stone bridge.

It is to be hoped that Government will follow out the course they wisely adopted a few months since with respect to the accl-

dents at Oldham and Northleach, and issue a commission of scientific and practical men, to investigate the character of the construction in all its bearings; and it is matter for consideration whether they should not forthwith appoint a permanent board of competent persons to inspect all such and similar constructions before they are opened to the public.

It is due to the architect under whose direction the bridge was originally erected to mention, that he was in no way connected with the recent enlargement. In a letter from that gentleman which we have seen, and (although not intended for publication), venture to quote, he says, "I have minutely examined the bridge and the broken fragments, and I find that the main chain broke near the pier, from a flaw in the interior of the bar of which it is composed, which no human eye could see or any foresight could enable any one to discover. The fracture did not occur at the parts where the greatest weight was, nor was the weight equal to what the bridge had often sustained."

We all know that the axle of a railway carriage has given way from a similar cause after having stood all tests that human ingenuity could apply, as likewise chain cables break from similar defects in the annealing or moulding of the iron."

#### HOUSES FOR THE LABOURING CLASSES.

THE best means of improving the dwellings of the poorer classes of the population occupies at this time the attention of many. The effect of the residence on the habits, and of the habits on the morals, is beginning to be understood, and there is a very general desire abroad, in the words of the Duke of Norfolk, "to put the poor man's house in order." At Birkenhead, opposite Liverpool, where a town with docks, sewers, public grounds, and other far-sighted arrangements, is rising with singular rapidity, an experiment is being made which merits attention. By the operations going on, great numbers of workmen have been brought to the place who require dwellings. The Birkenhead Dock Company have viewed the matter broadly: they have taken into consideration not merely profit and loss, but the comfort of the inmates and the welfare of their neighbours, and the course they have adopted, as we learn from our contemporary, the *Spectator*, is as follows:—"They have found it a better economy to build large houses rather than cottages; they have adopted a plan prepared by Mr. Charles Evans Lang, of London; and the buildings are now in progress. The ground which they are to occupy lies between two of eight streets that meet in a circus, and may be described as a triangle; across which, from street to street, houses are erected in rows, with alleys between; there is a school-house at the apex of the triangle, and in the centre of the circus a handsome church. Each row resembles what in Scotland is called a 'land,'—a pile four stories high, comprising several distinct houses, each house having a public staircase communicating with the several 'flats' or stories; each flat divided into two separate dwelling-places. Each dwelling contains a 'living-room,' two bed-rooms, and a 'yard.' The living-room is spacious, and well-arranged for ventilation and comfort; on one side are the entrance-door and the door into the yard; on the next side, near to the entrance are the doors into the two bed-rooms; on the third side, opposite to the bed-room doors, is the window; and on the fourth side is the fire-place; nearly the half of the room, towards this fourth side, is left without any door or other opening, so that the hearth is removed from direct draughts. In this room there is a gas-pipe, for light. The 'yard' is a sort of scullery, but comprising the sink, coal-hole, dust-hole, &c.; in short, all the 'domestic offices,' packed into a very close space, but fitted with conveniences not always found even in the houses of the middle-classes. Up the whole height of the building is a shaft, with which pipes from each yard communicate; at the top is a cistern with a preparation for keeping it full, to the extent of 1,000 gallons of water; from which, independently of individual use, a stream can be at pleasure made to rush down the shaft, carrying away the *effluvia* into the sewer, into which the shaft runs below. There is in